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The Characeae of Nebraska - Additions and Changes

Fay Kenoyer Daily

Walter Kiener

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Edited by

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The *Butler University Botanical Studies* journal was published by the Botany Department of Butler University, Indianapolis, Indiana, from 1929 to 1964. The scientific journal featured original papers primarily on plant ecology, taxonomy, and microbiology. The papers contain valuable historical studies, especially floristic surveys that document Indiana's vegetation in past decades. Authors were Butler faculty, current and former master's degree students and undergraduates, and other Indiana botanists. The journal was started by Stanley Cain, noted conservation biologist, and edited through most of its years of production by Ray C. Friesner, Butler's first botanist and founder of the department in 1919. The journal was distributed to learned societies and libraries through exchange.

During the years of the journal's publication, the Butler University Botany Department had an active program of research and student training. 201 bachelor's degrees and 75 master's degrees in Botany were conferred during this period. Thirty-five of these graduates went on to earn doctorates at other institutions.

The Botany Department attracted many notable faculty members and students. Distinguished faculty, in addition to Cain and Friesner , included John E. Potzger, a forest ecologist and palynologist, Willard Nelson Clute, co-founder of the American Fern Society, Marion T. Hall, former director of the Morton Arboretum, C. Mervin Palmer, Rex Webster, and John Pelton. Some of the former undergraduate and master's students who made active contributions to the fields of botany and ecology include Dwight. W. Billings, Fay Kenoyer Daily, William A. Daily, Rexford Daudenmire, Francis Hueber, Frank McCormick, Scott McCoy, Robert Petty, Potzger, Helene Starcs, and Theodore Sperry. Cain, Daubenmire, Potzger, and Billings served as Presidents of the Ecological Society of America.

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THE CHARACEAE OF NEBRASKA— ADDITIONS AND CHANGES

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AND

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Since the joint studies by Kiener (4) and Daily (1) on the Characeae of Nebraska in 1944, numerous collections have been made in the state. They are reported here with some changes in nomenclature in the interest of consistency or priority as presently conceived, descriptions, illustrations and a complete key. All collections cited in this report were made by Walter Kiener except one. The firsr set of specimens is in the herbarium of Fay Kenoyer Daily, the second set is in the herbarium of the University of Nebraska, and successive sets are in various other herbaria.

In 1944, Kiener (4) reported on 141 collections made in 36 counties. Together with this paper 357 collections are now reported. Thus 216 collecrions were added. The area of collection was extended over seven more counties, making a total of 43 counties. This number is slightly less than half of the 93 counties in Nebraska. Some aquatic habitats in evety county have been examined at some time or other without finding any Characeae. Yet, a specific search will eventually reveal some in nearly all counties, although some counties do not appear to have suitable habitats for tbese plants.

In the last few years, Nebraska has again entered a cycle of somewhat less rainfall whicb in turn reduces the number of rainwater basins as well as the seasonal duration during which water remains standing. Inasmuch as the species of Nitella in Nebraska are largely restricted to these basins, the chances of their occurrence were very slim.

The sandhill area, comprising about 20,000 square miles, with many marshes and shallow lakes has not yet been explored. From preliminary sampling, however, it appears that species of Characeae are important members of the plant populations in these lakes and marshes and eventually may reveal interesting plant-life stories.

We wish to acknowledge the cooperation of W. A. Daily, the late J. E. Potzger and John E. Pelron of Butler University, Francis Drouet of Chicago Natural History Museum, and D. P. Rogers of New York Boranical Garden.

Coronula of two superimposed rows of five cells each.

Antheridia terminal; mature oospore laterally compressed. . . . .NITELLA

Ultimate rays of branchlets one-celled; coronula deciduous.

Monoecious.

Heterophyllous (branchlets of two sorts; accessory, simple branchlets produced below and alternately with once-furcate branchlets) ....1. *Nitella clavata*

Homoeophyllous (branchlets similar, once-furcate)

Ultimate rays acuminate..... ... ..2. *N. acuminata*

Ultimate rays acute..... ....3. *N. flexilis*

Dioecious; branchlets simple, once-furcate.....4. *N. opaca*

Ultimate rays of branchlets two-celled; coronula persistent.

Fertile branchlets contracted into axillary heads. . .5. *N. axillaris*

Fertile and sterile branchlets similar.

Plant small; ultimate rays long (½ length of branchlet)..... . ... 6. *N. confervacea*

Plant large, ultimate rays variable with some very short. .... .7. *N. oligospira*

Antheridia lateral; mature oospore terete... . .. . .TOLYPELLA

Sterile branchlets divided; coronula persistent.....8. *Tolypella intricata*

Sterile branchlets undivided.

Lateral and ultimate rays considerably attenuated; coronula persistent; outer membrane of oospore not decorated....9. *T. prolifera*

Lateral and ultimate rays not much attenuated; coronula evanescent; outer membrane of oospore with linear granulations..... ....10. *T. glomerata*

Coronula composed of one row of five cells; antheridia produced below oogonia in monoecious species..... ... .CHARA

Ecorticate; stem and branchlets naked.... . ...11. *Chara Braunii*

Corticated; stem and portions of branchlets covered by a sheath consisting of longitudinal rows of cells.

Stem falsely haplostichous; secondary cells developed but extend only a short distance from the node.

Oospore ca. 580μ long, broadly elliptical, with 10-12 ridges. .... .12. *C. evoluta*

Oospore ca. 650μ long, narrow, with 15 or 16 ridges .. ..13. *C. hirsuta*

Stem diplostichous; secondary cells may sometimes overlap a short distance.

Primary cells prominent .....14. *C. contraria*

Secondary cells prominent.....15. *C. vulgaris*

Stem falsely diplostichous; two secondary cells may be produced between primaries but one may be very short; spines single.....16. *C. excelsa*

Stem cortex very irregular but mostly diplostichous; may be haplo-, diplo-, triplostichous; spines single and in pairs.....17. *C. Kieneri*

Stem triplostichous; occasionally irregular.

Lowest branchlet internode diplostichous.

Monoecious.

Cells of stem cortex equal in diameter; cortication usually regular.....18. *C. globularis*

Cells of stem cortex unequal in diameter; primary cells larger and more prominent; cortication usually regular, but sometimes irregular.....19. *C. delicatula*

Dioecious; cells of stem cortex about equal in diameter; stem irregularly triplostichous due to long overlapping secondary cells.....20. *C. aspera*

Lowest branchlet internode ecotticate; next internode triplostichous; rarely all naked.

Antheridia and oogonia conjoined (borne at same node).....21. *C. zeylanica*

Antheridia and oogonia disjoined (borne at different nodes).....22. *C. sejuncta*

1. NITELLA CLAVATA (Bertero) A. Br. Char. Aust. Hook. Journ. 1:195. 1849.

For description, illustrations and citation of specimens see Daily (1). No further collections of this species are at hand from Nebraska since that report.

2. NITELLA ACUMINATA VAR. SUBGLOMERATA A. Br. Abh. Kön. Akad. Wiss. Berl. (1882) : 36. 1883.

The treatment of this entity as a variety rather than a species is used for consistency.

Descriptions and illustrations are given in Woods (5) and Daily (1) as *Nitella subglomerata.*

Specimens seen: BOYD COUNTY: Rainwater basin, 3 mi. southeast of Naper, *27759A, 27759B* with *Chara Braunii,* Sept. 8, 1951. CLAY COUNTY: Rainwater basin, northwest of Ong, *22539,* Aug. 9, 1947. FILLMORE COUNTY: With

Chara Braunii, intermittently wet ground, 3 mi. west of Fairmont, *17161*, *17162*, *17163*, Aug. 15, 1944, rainwater basin, northwest of Shickley, *22550*, Aug. 9, 1947. HAMILTON COUNTY: Intermittent pool, 6 mi. west of Aurora, *17216A*, *17217*, Aug. 18, 1944, *17578*, Sept. 4, 1944, *22402*, July 23, 1947.

3. NITELLA FLEXILIS (L. pro parte) Ag. Syst. Alg., p. 124, Lund, 1824.

Descriptions and illustrations are given in Woods (5) and Daily (3) under *N. flexilis* var. *flexilis*. This species was excluded from the 1944 study of the Nebraska Characeae by the author because the specimen cited by Woods upon which the report was based could not be found.

Specimen seen: BUFFALO COUNTY: Loup River pond, South of Ravenna, *20196*, May 3, 1946.

4. NITELLA OPACA Ag. Syst. Alg., p. 124. Lund, 1824.

Descriptions and illustrations are given in Woods (5) and Daily (1).

Specimens seen: DOUGLAS COUNTY: Carter Lake, Omaha, *20010*, *20014*, Apt. 26, 1946.

5. NITELLA AXILLARIS A. Br. Monatsber. Kön. Akad. Wiss. Berl. (1858): 356. 1859.

Descriptions and illustrations are given in Woods (5) undet *Nitella translucens* and Daily (1) under *Nitella axillaris*.

Specimens seen: CLAY COUNTY: Roadside ditch, northwest of Ong, *22540*, Aug. 9, 1947. FILLMORE COUNTY: With *Chara Braunii*, intetmittent pool, 3 mi. west of Fairmont, *17162*, *17163*, Aug. 15, 1944; rainwater basin, northwest of Shickley, *22346* with *C. Braunii*, July 1, 1947, *22549*, Aug. 9, 1947. HAMILTON COUNTY: Intermittent pool, 6 mi. west of Aurora, *17216*, Aug. 18, 1944, *17217* with *N. acuminata* var. *subglomerata*, Aug. 18, 1944, *22402* with *N. acuminata* var. *subglomerata*, July 23, 1947.

6. NITELLA CONFERVACEA A. Br. ex Leonh. Lotos 13:146. 1863.

For descriptions, illustrations and citation of specimens see Daily (1) under *Nitella batrachosperma* A. Br. No futther collections of this species are at hand from Nebraska.

7. NITELLA OLIGOSPIRA A. Br. Monatsber. Kön. Akad. Wiss. Berl. (1858): 357. 1859.

PLATE I-A

Plants usually described as 20-25 cm. in height, but Nebraska material lacks complete plants; stem ca. 625 μ with usually 5 or 6 branchlets at a node; monoecious; fruiting bodies not enveloped in mucus; branchlets of sterile and and fertile whorls similar, usually 2-3 (4) times furcate, primary rays ca. $\frac{1}{2}$—1/3 length of entire branchlet, secondary rays usually 5 or 6 at a node, tertiary rays usually 3 at a node, quaternary rays (if present) 2 or 3 at a node; ultimate rays unequal in size with some very small, 2-celled, end cell a mucro;

oogonia usually located singly at the second and third branchlet nodes; coronula persistent; oospore light brown, ca. 6 inconspicuous ridges, ca. 290 μ in length, ca. 240 μ in width; outer oospore membrane with interrupted reticulation; antheridia up to 370 μ in diameter.

Specimen seen: FILLMORE COUNTY: Rainwater basin, northwest of Shickley, *22548*, Aug. 9, 1947.

8. TOLYPELLA INTRICATA (Trenrepohl ex Roth) Leonh. Lotos 13:57. 1863.

For descriptions and illustrations see Daily (2). No further collections are at hand from Nebraska.

9. TOLYPELLA PROLIFERA (Wallr.) Leonh. in Lotos 13:57. 1863.

A description and illustrations are given in Daily (2).

Specimens seen: DOUGLAS COUNTY: With *Nitella opaca*, water 8 ft. deep, Carter Lake, Omaha, *20014*, Apr. 26, 1946. LINCOLN COUNTY: Floodplain ditch, Pawnee Springs, *22311*, June 24, 1947.

10. TOLYPELLA GLOMERATA (Desv. in Loiseleur-Deslongchamps) Leonh. in Lotos 13:129. 1863.

A description and illustrations are given in Daily (2).

Specimens seen: DOUGLAS COUNTY: With *Nitella opaca*, water 8 ft. deep, Carter Lake, Omaha, *20014*, Apr. 26, 1946. SCOTTS BLUFF COUNTY: With *Chara contraria*, gravel pit pond, Scottsbluff, *22027*, *22029*, *22030*, *22037*, May 18, 1947, *23493*, May 9, 1948.

11. CHARA BRAUNII Gmel. Fl. Bad. Alsat. 4:646. Carlsruhe. 1826.

Descriptions and illustrations are given in Woods (5) and Daily (1) as *Chara coronata*.

Specimens seen: BOYD COUNTY: Rainwater Basin, 3 mi. southeast of Naper, *27759B*, Sept. 8, 1951. CHERRY COUNTY: Valentine Lakes Refuge, marshy creek below Willow Lake, *27595A*, *27595B*, Hay Lake marsh, *27613*, Aug. 27, 1951. DOUGLAS COUNTY: Carter Lake, Omaha, *17649*, Sept. 12, 1944. FILLMORE COUNTY: Intermittent pool, 3 mi. west of Fairmont, *17161* with *Nitella acuminata* var. *subglomerata*, *17162*, *17163*, Aug. 15, 1944; rainwater basin, 3 mi. northwest of Shickley, *22346*, July 1, 1947, *22548* with *N. oligospira*, 22549 with *N. axillaris* and 22551, Aug. 9, 1947. HAMILTON COUNTY: Intermittent pool, 6 mi. west of Aurora, *17216*, *17216A* and *17217* with *N. acuminata* var. *subglomerata*, Aug. 18, 1944, *17578* with *N. acuminata* var. *subglomerata*, Sept. 4, 1944, *22402* with *N. acuminata* var. *subglomerata*, July 23, 1947. HOWARD COUNTY: Loup River pool, St. Paul, *22906*, Oct. 14, 1947. LINCOLN COUNTY: Edge of spring-fed creek, Whitehorse Creek, 7 mi. notth of North Platte, *17508*, Sept. 1, 1944.

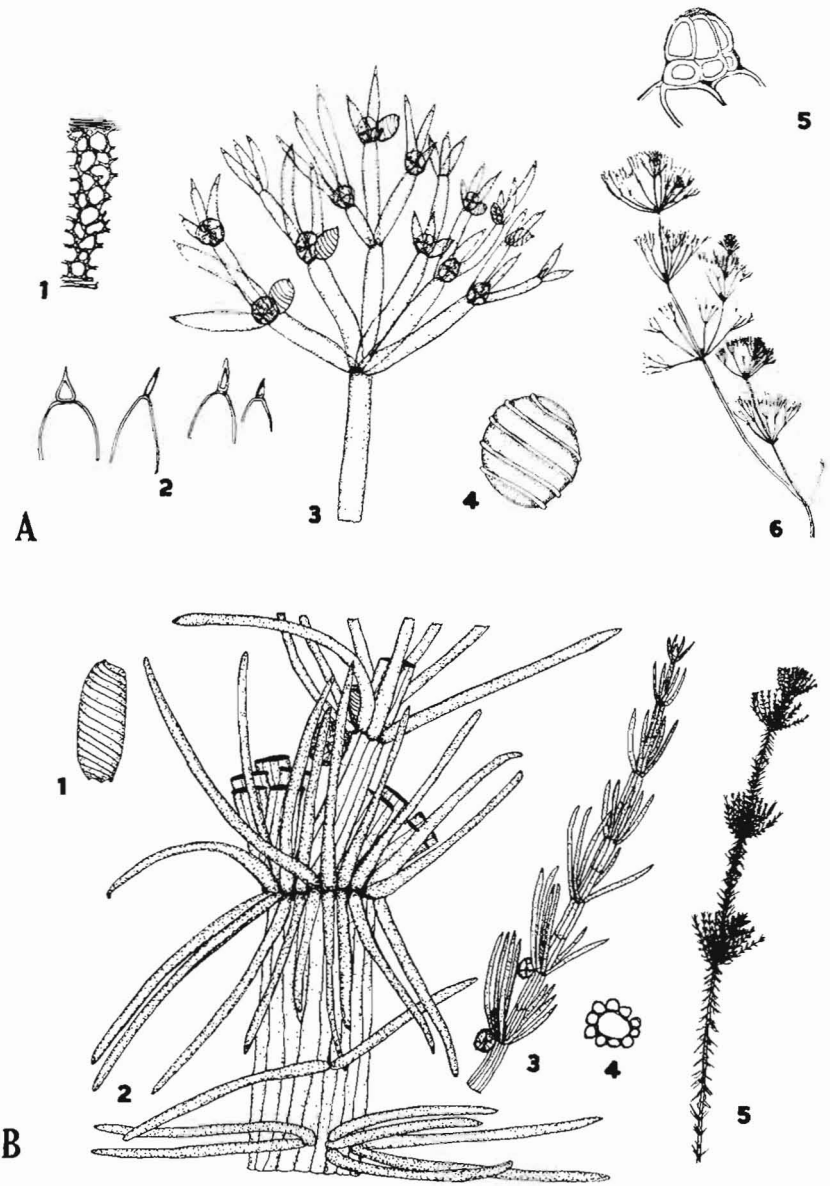

Plate I. A. NITELLA OLIGOSPIRA A. Br. 1. Small portion of outer oospore membrane. 2. End cells of ultimate rays. 3. Branchlet. 4. Oospore. 5. Coronula. 6. Portion of plant. B. CHARA HIRSUTA T. F. Allen. 1. Oospore. 2. Base of branchlet whorl. 3. Branchlet. 4. Cross section of stem. 5. Portion of plant. All drawings are enlarged except the habit sketches which are natural size.

12. CHARA EVOLUTA T. F. Allen. Bull. Torrey Bot. Club 9:41, pl. 19. 1882.

Descriptions and illustrations are given in Woods (5) and Daily (1).

Specimen seen: DUNDY COUNTY: *21209*, July 29, 1946.

13. CHARA HIRSUTA T. F. Allen. Bull. Torrey Bot. Club 27 (6):301. June, 1900.

PLATE I-B

Mature plants up to 20 cm. (some of plants not entire); sparsely branched; monoecious; ca. 10 branchlets at a stem node; stipulodes in two whorls at the base of the branchlet whorls, both upper and lower series variable in length, up to 2 mm. in length but some very short; stem cortex haplostichous (occasionally small secondary cells formed), with occasional interstices; spine cells 1-3 together, but usually 2, very variable but up to 2 mm. in length; branchlets with ca. 7 nodes, 7 singly corticated internodes (sometimes having interstices) and an ecorticate terminal cell surrounded by a tuft of bracts; bracts and bracteoles very long, 8 at the lowest branchlet node; oospore black, truncate at both ends, ca. 610—680 (720) μ long, 215—238 μ wide, with 15 or 16 ridges; antheridia up to 365 μ in diameter.

Specimens seen: SHERIDAN COUNTY: sandhill marsh pond west of Antioch, *20592*, May 23, 1946; marsh pond east of Antioch, *20615*, May 23, 1946.

Apparently this species has not been reported thus far from any location besides the type. The type specimen located at the New York Botanical Garden was seen. The Nebraska collections are very similar but have longer stipulodes, bracts, bracteoles and spine cells. In respect to these characteristics, Kiener collection *20615* is nearest the type and Kiener collection *20592* has the longest. However, in respect to plant stature, some plants of *20615* are only 8 cm. high while *20592* compares favorably with the type. After more specimens are found, it may be discovered that there is intergrading between *Chara hirsuta* and *Chara evoluta* to the extent that they should be considered one species.

It was found that the type specimen has occasionally 3 spine cells together. Also, some oospores are up to 330 μ in width. The Nebraska material, therefore, is in agreement.

14. CHARA CONTRARIA A. Br. ex Kűtz. Phyc. Germ.:258. Nordhausen, 1845.

Descriptions and illustrations are given in Woods (5) and Daily (1).

Specimens seen: BANNER COUNTY: North of Harrisburg, Pumpkin Creek, *22720*, Aug. 21, 1947; northeast of Harrisburg, pool, Bighorn gulch, *22734*, Aug. 21, 1947. BUFFALO COUNTY: In gravel pit pond, Kearney, south on Platte River, *18016*, Nov. 6, 1944; gravel pit pond, south of Kearney, *18881*, May 4, 1945; gravel pit pond, south of Gibbon, *22894*, Oct. 14, 1947; Loup

River pond, south of Ravenna, *20200,* May 3, 1946. BUTLER COUNTY: Sandpit pond, north of David City, *21566, 21570,* Nov. 8, 1946. CHASE COUNTY: Cattle watering tank, 10 mi. west of Champion, *23582,* May 15, 1948. CHERRY COUNTY: Shell Lake, northeast of Gordon, *22205,* May 26, 1947; fish hatchery pond, Valentine, *23771,* June 18, 1948; bank pools of North Loup River, near Brownlee, highway 83, *23902,* June 22, 1948. DAWES COUNTY: Chadron Creek, Chadron State Park, *20359,* May 15, 1946, *20398,* May 17, 1946; old pond, east of Crawford, *20403,* May 17, 1946; Little Bordeaux Creek, *20565,* Little Bordeaux Creek pools, *20566, 20567,* May 22, 1946; DAWSON COUNTY: Sand pit lake, Lexington, *16851,* June 16, 1944. DODGE COUNTY: Gravel pit pond, Fremont State Park, *23921,* July 1, 1948. DOUGLAS COUNTY: Floodplain pond near Carter Lake, Omaha, *17636,* Sept. 12, 1944; Carter Lake shore, Omaha, *17650,* Sept. 12, 1944, *20009,* Apr. 26, 1946, *26197, 26201,* Sept. 20, 1950. DUNDY COUNTY: Ponds, Rock Creek Hatchery, *19499-19501, 19503, 19504, 19507, 19508-19510, 19512, 19516, 19517, 19519, 19526-19528, 19533, 19535, 19538,* Aug. 3, 1945; pond, Rock Creek Park, *19421, 19422,* Aug. 3 1945; Rock Creek Lake State Park, off-set pool and streamlet, *19728, 19729, 19734,* Oct. 5, 1945; Rock Creek above parks, headwater springs and marsh, *19865, 19866,* Oct. 9, 1945; *21179, 21201, 21202, 21204, 21206, 21207* with *C. aspera,* July 29, 1946. GARDEN COUNTY: Roadside pond, south of Oshkosh, *21105, 22014, 22015,* May 24, 1947; floodplain slough, Lewellen, 4 mi. east, *23450,* May 5, 1948. GRANT COUNTY: Marsh pond, 4 mi. east of Whitman, *20661,* May 26, 1946. HALL COUNTY: Floodplain ditch, southeast of Grand Island on Platte River, *17876,* Oct. 29, 1944, *21106,* July 8, 1946, *22406,* July 23, 1947. HOWARD COUNTY: Loup River pool, St. Paul, *22907,* Oct. 14, 1947. KEARNEY COUNTY: Gravel pit pond on Platte River, north of Axtell, *18008,* Nov. 6, 1944, *18963, 18964, 18966,* May 23, 1945. KEITH COUNTY: Spring seepage among mosses, Lonergan Creek, Lemoyne, *23366,* May 4, 1948; edge of seepage pond, northeast of Ogallala, *27305, 17306,* July 24, 1951; drainage ditch north of Ogallala, *27921, 27935,* Oct. 8, 1951; running water of Lonergan Creek, Lemoyne, northwest of Ogallala, *28835,* Aug. 28, 1952. KIMBALL COUNTY: Lodgepole Creek, Bushnell, 8 miles west, *22672,* Aug. 18, 1947; Bennet Reservoir, east of Kimball, *22699, 22700,* Aug. 18, 1947. LINCOLN COUNTY: Spring-fed slough along highway, North Platte, *17298,* Aug. 24, 1944; shallow water, cut off meander, Fremont slough, 1 mile south of North Platte, *17945,* Nov. 2, 1944; mucky bottom of old shallow river pool, North Platte, on South Platte River, *17951,* Nov. 4, 1944; roadside ditch north of North Platte, *18727,* Apr. 24, 1945; island pool, North Platte River, North Platte, *18740,* Apr. 25, 1945; gravel pit pond, south of North Platte, *18775,* Apr. 27, 1945; channel pool on island, Platte River, south of Brady, *19080a, 19082,* May 29, 1945; gravel pit pond, Brady Island, *19119,* May 30, 1945. MERRICK COUNTY: Sand pit pool, near Clarks, roadside park, *22917,* Oct. 15, 1947; gravel pit pond, Central City , *23913,* June 23, 1948. MORRILL COUNTY:

Floodplain ditch, south of Broadwater, *22017, 22018,* May 17, 1947; floodplain ditch west of Bridgeport, *22160,* May 23, 1947; gravel pit pond, south of Bayard, *22166,* May 23, 1947; cattail marsh, southeast of Bayard, *24279,* Dec. 2, 1948; artesian spring pool, southwest of Broadwater, *24326,* Dec. 3, 1948. REDWILLOW COUNTY: Roadside ditch, west of Cambridge, *19405,* July 31, 1945. SCOTTS BLUFF COUNTY: Gravel pit pond, west of Scortsbluff, *22021, 22026, 22027, 22029, 22030, 22037-22039,* May 18, 1947; gravel pit pond, Scottsbluff, *22042, 22051, 22068,* May 20, 1947; gravel pit pond, west end of Scottsbluff, *23492, 23493* with *Tolypella glomerata,* May 9, 1948; seepage, Akers Draw, northeast of Morrill, *25112,* Nov. 22, 1949. SHERIDAN COUNTY: Marsh pond, west of Antioch, *20593,* May 23, 1946; roadside marsh pond, east of Lakeside, *20616,* May 23, 1946. SHERMAN COUNTY: Floodplain pond, Loup City, *24222,* Nov. 3, 1948. SIOUX COUNTY: Seepage ponds, Sheep Cteek spring, 3 mi. north of Henry, *23521,* May 10, 1948.

15. CHARA VULGARIS Vaill. ex L. Sp. Pl., p. 1156. Stockholm, 1753.

Illustrations and descriptions are given in Woods (5) and Daily (1) under the name *Chara foetida* A. Br.

Specimens seen: BANNER COUNTY: Game preserve pond, north of Harrisburg, *22140,* May 22, 1947. BUFFALO COUNTY: Loup River pond, south of Ravenna, *20197,* May 3, 1946; pool of Sweetwater Creek, south of Ravenna, *20818* with *Chara delicatula,* May 29, 1946. CHEYENNE COUNTY: Lodgepole Creek, Potter, 5 mi. east, *22602,* Aug. 16, 1947. DUNDY COUNTY: Rock Creek hatchery, *19514,* Aug. 3, 1945; *21200, 21203,* July 29, 1946. KEITH COUNTY: Floodplain ditch, North Platte River, west end of county, *22476,* July 27, 1947; drainage ditch, north of Ogallala, *27918, 27919,* Oct. 8, 1951. SCOTTS BLUFF COUNTY: Gravel pit pond, west end of town, Scottsbluff, *22031,* May 18, 1947; gravel pit pond, Scottsbluff, *23494,* May 9, 1948; seepage, Akers Draw, northeast of Morrill, *25112* wirh *C. contraria,* Nov. 22, 1949.

16. CHARA EXCELSA T. F. Allen, Bull. Torrey Bot. Club 9(4):43. Apr., 1882.

A description and illusttations are given in Daily (3).

Specimens seen: GRANT COUNTY: Sandhill marsh pond, 5 mi. east of Hyannis, *20643,* May 26, 1946. SHERIDAN COUNTY: Marsh pond, west of Antioch, *20595, 20600,* May 23, 1946.

17. CHARA KIENERI Daily. Butler Univ. Bot. Stud. 9:127-130. 1949.

The type specimen was collected in Nebraska.

Specimens seen: GRANT COUNTY: Marsh pond, 4 mi. east of Whitman, *20662,* May 26, 1946. SHERIDAN COUNTY: With *Chara aspera,* marsh pond, west of Antioch, *20591A,* May 23, 1946.

18. CHARA GLOBULARIS Thuill. Flor. Env. Paris, ed. 2, p. 472. 1799.

Descriptions and illustrations are given in Woods (5) and Daily (1) under the name *Chara fragilis* Desv.

Specimens seen: BUFFALO COUNTY: Gravel pit pond, Gibbon, *17880,* Oct. 29, 1944. CHEYENNE COUNTY: Pool in Lodgepole Creek, east of Potter, *22627,* Aug. 16, 1947. DOUGLAS COUNTY: Carter Lake, Omaha, *17648, 17649,* with *C. Braunii* Sept. 12, 1944; sand pit pond, Valley, *26146,* Sept. 20, 1950. DUNDY COUNTY: Fish ponds, Rock Creek Hatchery, *19535,* with *C. contraria,* Aug. 3, 1945; *21208* with *Chara aspera,* July 29, 1946. GRANT COUNTY: Sandhill marsh pond, Hyannis, 5 mi. east, *20643* with *C. excelsa,* May 26, 1946. SHERIDAN COUNTY: Sandhill marsh pond, east of Lakeside, *20617, 20618,* May 23, 1946. WEBSTER COUNTY: Pond of Pawnee Recreation Ground, west of Guide Rock, *11055a,* Aug. 14, 1941.

19. CHARA DELICATULA Ag. Syst. Alg., p. 130. Lund, 1824. (non Desv.).

A description and illustrations are given in Daily (1) under the name *Chara verrucosa* Itzig:

Specimens seen: BUFFALO COUNTY: Pool of Sweetwater Creek, south of Ravenna, *20818,* May 29, 1946. SHERIDAN COUNTY: Marsh pond west of Antioch, *20598, 20599,* May 23, 1946.

20. CHARA ASPERA Willd. Ges. Naturf. Fr. Berl. Mag. 3:298. 1809.

The descriptions and illustrations given in Daily (1) are of the var. *Macounii* Allen. Typical material having long spines, bracts, bracteoles and stipulodes has been found in Nebraska since then.

Specimens seen: DUNDY COUNTY: Fish ponds, Rock Creek Hatchery, *19502,* also collections with *Chara contraria 19507, 19510,* and *19533,* Aug. 3, 1945; *21207, 21208,* July 29, 1946. SHERIDAN COUNTY: Marsh pond west of Antioch, *20591A, 20591B, 20592* with *Chara hirsuta, 20593* with *C. contraria, 20598* and *20599* with *C. delicatula,* May 23, 1946.

21. CHARA ZEYLANICA Willd. Mem. Acad. Roy. Sc. Berl. (1803):86. 1805. Berlin.

A description and illustration are given in Daily (1) under the name *Chara gymnopus.* Since confusing intermediates occur, the forms of this species are difficult to separate. However, probably two forms, *macilenta* (A. Br.) Daily, and *Michauxii* (A. Br.) H. & J. Groves, are represented in the specimens below.

Specimens seen: DODGE COUNTY: Sand pit lake, Fremont, *21476,* Aug. 29, 1946. DOUGLAS COUNTY: Shallow water, Carter Lake, Omaha, collected by *Howard L. Wiegers, Kiener* Col. No. *21519,* Aug. 31, 1946, *26194, 26196,* Sept. 20, 1950.

22. CHARA SEJUNCTA A. Br. in G. Engelmann and A. Gray. Plantae Lindheimerianae. Bost. Jour. Nat. Hist. 5:264. 1845.

For description and illustrations see Woods (5) and Daily (1). No further collections are at hand from Nebraska.

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